Japanese Corporate and Industrial System at a Historical Turning Point

著者	十名 直喜
journal or publication title	THE NAGOYA GAKUIN DAIGAKU RONSHU; Journal of Nagoya Gakuin University; SOCIAL SCIENCES
volume	37
number	1
page range	65-87
year	2000-07-31
URL	http://doi.org/10.15012/00000799

名古屋学院大学論集　社会科学篇　第37巻　第1号（2000年7月）

Japanese Corporate and Industrial System at a Historical Turning Point(1)

Naoki Tona

Abstract

This paper analyzes and describes the modern corporate and industrial system through comparisons with Japanese traditional industrial and regional systems. Such systems have long historical roots, going back over one thousand years. The comparisons will give us a meaningful suggestion to grasp and rethink Japanese contemporary system of corporation, industry and region. This work not only describes the overall and core of Japanese modern and contemporary system, but also analyzes new generation type movements of today's undercurrent. The viewpoint transcends contemporary, involving past and future.

This research study consists of four chapters. In chapter one, the Japanese traditional industrial and regional system is analyzed and described through comparisons with the modern Japanese, Western-based, industrial system. The second chapter describes the overall picture of Japanese modern industrial and corporate system and formulates the fundamental features. In chapter three, there is a discussion of the Japanese paradigm in contemporary and corporate networks. This chapter characterizes the latest movement: it analyzes and suggests the vector conversion toward the future. The fourth chapter theorizes and deepens the new paradigm in the industrial, corporate system and manufacturing.

Introduction

The confidence placed in the Japanese economy has been badly shaken by various problems besetting the administration and finance system. This confidence has been especially undermined by the recent Asian economic turmoil triggered by the monetary collapse among Asian countries. Furthermore, a rush of accidents in 1999, caused by human error, has also seriously shaken the faith of ordinary Japanese in the safety of many of the country's proudest high-technology achievements(2).

Nevertheless, the technology and production system of the Japanese manufacturing industry, especially big exporters, is still highly thought of, both domestically and internationally. But these exporters cluster in just a handful of industries: cars and car parts, industrial machinery, consumer electronics and steel. It is generally accepted that much of the rest of the Japanese industries is grossly inefficient (The Economist, 27/11/1999).

At this stage two main questions can be asked. What are the core elements of the Japanese corporate and industrial system ? And how can we describe the overall picture of the system ? This thesis will analyze the fundamental characteristics and give careful consideration to this topic area. It also aims to provide solutions to overcoming current economic problems.

My research involves studying the fundamental characteristics of the Japanese corporate and industrial system mainly through investigating Japan's iron and steel industry (Tona 1993; 1996a; 1996b). Recently, I have also examined the porcelain industry in Seto city; the traditional pottery and porcelain center of Japan. I am especially interested in investigating the shifting patterns and relationships of the traditional industries, the introduction of new technology, and their effects on the local or regional culture.

This thesis is based on the comparative historical analysis of industries that I obtained through the above study. The concept of "vertical" and "horizontal" system, which is theoretically based on the definition by Nakane (1967, 84), is important in this thesis. There is also a focus on the term of "know-how" methods, which I have based on Ikegami (1996a; b; c). I define this term as the way in which knowledge and skills are integrated and practically applied to industrial development.

Today, there is a need to create a new paradigm and system beyond modern Japanese and Western models, in order to achieve sustainable and coexistent development. This thesis develops the approach that includes Japanese traditional industry and regional system, and considers the modern western-based system, in order to further elaborate and develop my analysis.

1 The Japanese traditional regional system and industry: comparisons with modern Japanese, western-based, industrial systems

1. 1. The traditional model of the Japanese agrarian landscape and rice farming

Japan's agricultural production is based on rice cultivation. Until recently, this system was able to support Japanese society and economy for over a thousand years. It formed the model for rural landscapes, industries, social life and the natural environment at both the regional and national level up until the early 1960s.

The traditional image or model of the Japanese rural landscape consists of certain typical features: for example, small rice paddies divided by ridges, meandering streams, scattered villages with their shrines and groves; with the scene surrounded by a backdrop of high mountains. This rather idyllic landscape was typical throughout Japan before the advent of high economic growth (Tomiyama 1993: 84). Such images are often invoked throughout traditional folk culture and language. They are often depicted in the words of popular Japanese folk sayings, such as these lines from "*Furusato*" ("My Country Home"); "Back in the mountains I knew as a child; Fish filled the rivers and rabbits ran wild" (Greg 1998: 39). Certainly, European visitors in the last years of the Edo and in the Meiji period were struck by this beautiful rural landscape as well as urban life-style: both reflected an ecologically well-balanced natural environment. After visiting Japan, a number of western visitors returned home inspired by the concept of a rural garden city. This idea was later further developed in Europe (Kawakatsu 1997: 11).

1. 2. The difference in characteristics and aspects between the modern Japanese industrial system and the traditional ones

1. 2. 1. The basic differences in key industries: the shift from an agrarian society to a modern industrial society

The characteristics and aspects of the modern Japanese industrial system, which has been formed and developed since the Meiji period, and especially in the postwar period, are entirely different from those of the traditional Japanese industries. Firstly, the difference resulted from a shift in key industries, from an agrarian society to a modern industrial society. Agriculture depends on the local environment, such as climatic and fundamental resources such land and water. The most fundamental, natural resources is, of course, land. However, its exploitation is heavily dependent on its natural condition. On the other hand, modern industry is based on artificial means such as man-made technology. This is essentially different from agricultural production (Nakamura, Se. 1973: 199-200).

1. 2. 2. Differences in agricultural systems between Japan and Europe

Japan's agricultural system is based on rice paddy production, which exploits the seasonal monsoon climate of East Asia. The system differs from the European systems that chiefly depend on large-scale, intensive farming and cattle breeding. The fundamental difference between paddy and farm systems is that in paddy fields the ground is leveled and irrigated by constructed watercourse systems. On the other hand, the farming system allows cultivation on various slopes, hillsides or inclines, without intensive irrigation systems. Japan's landscape features steep mountains, waterfalls, rapid flowing rivers, and narrowly inclined

plains. Therefore, it is necessary to level high ground in order to build flat rice paddies. Steeply inclined rivers have to be remodeled into slower flowing, meandering watercourses (Tomiyama 1993: 35-36). This national land development, which became the basis of Japan's land cultivation, was almost complete by the eighth century. Furthermore, the second remodeling of national land was carried out in the era of Riparian development (i.e. dike construction). Through this development, new paddies were reclaimed dating from the late years of the Muromachi to the middle of the Edo period (Tomiyama 1993: 83-84).

The close relationship between water and farmers can be seen in many old sayings. For example, "*Nemimi ni mizu*", which originally came from a fear that farmers could suddenly be inundated at night when they were asleep. The expression reflects the often hazardous relationship between nature and cultivators. Such words as "*Mizukusai*", "*Mizu ni nagasu*" also show the difficulties and perceptions of life concerning one's own paddy field, village, and neighbor's land (Tomiyama 1993: 27-29). It is important to be acutely aware to the ecological and organic relationships between forests, rivers and paddies. Proper management can be achieved by planting trees in the mountains and forestry management. Also, attention must be paid to preventing storm, flood and drought damage (Tomiyama 1993: 97).

1.2.3. The basic difference in the methods of the industrial and regional systems: the conversion from a model based on self-sufficiency and recycling to that of a one-way use system

Secondly, the basic difference between the traditional and modern industry of Japan exists in the methods of the industrial and regional systems. This depends on the conversion from a self-sufficiency system based on a recycled use of regional resources to a one-way use system of external resources. This conversion was achieved by introducing advanced technology from Europe and America. During the Edo period, an autarky type industry(3) and regional system developed. However, following the Meiji period, and especially in the postwar period of high economic growth, the heavy chemical industries were largely dependent on western advanced technology and overseas mineral resources.

Modern industry and agriculture are also fundamentally different in their raw materials and resources. Modern industry chiefly depends on mineral resources, whereas agriculture basically depends on soil resources. Soil resources such as, agricultural lands are unmovable regional resources, which can neither be exported nor imported. Conversely, mineral resources are movable universal resources that can be conveyed to any location after excavation. Agriculture has an organic chain based on regional resources and its recycling use (Inoue 1992: 85), while modern industry has features that depend on offshore resources. But it also has difficulties involving the recycling of waste products.

1.2.4. Technological comparisons between Japan's traditional industrial and regional system, and modern western-based systems

Japan's traditional industrial and regional system, which was established under the closed-door policy, was based on scarce land resources but with abundant manpower. It is characterized by capital-saving, labor-intensive technology for improving land-productivity. On the other hand, in modern advanced Western countries, capital-intensive, labor-saving type industry and regional systems developed on the assumption that there were vast land areas and abundant resources including overseas colonies or land areas. An example of this can be seen in the exploitation of the American continent. This process of development required a wide distribution of manpower. These two factors interacted and affected each other. It can be seen that contemporary Japan's industrial and regional system is largely modeled on the latter, that is, the Western system (Kawakatsu 1997).

It should be noted that affluent manpower, which is seen as the basis of Japanese traditional industrial and regional system, has its origins in rice farming agriculture and paddy cultivation. Rice has a high productivity level, high nutritive value, and is easy to preserve (Tomiyama 1993: 19-20). The paddy field is a valuable resource: it is durable enough to withstand annual planting; it can provide it's own fertilizers for itself, prevent topsoil from being washed away, and it can also sustain a sizeable population (Inoue 1992: 261-62).

Rice farming developed an effective and efficient technology for irrigating and draining water, and advanced hydrological calculations (Tomiyama 1993: 12). Mountain villages also flourished as the heart of this culture, stimulating arts, crafts, and performing arts peculiar to a locality over periods of time. Forests have also been supported, protected, and managed by the prosperity generated by mountain life and culture in Japan (Tomiyama 1993: 85-85).

1.3. An integrated view and approach to the Japanese traditional industry and culture

Technology and culture in the rice farming industry of the Edo was characterized by its system of recycling which was used to cultivate forests, enhance sources of water and soil, and utilize the national land for various purposes. Its transportation system linked together plains, mountains, rivers and ocean. Kawakatsu (1997) claims that communication and trade to and from the ocean has been so far lacking in traditional historical accounts (Kawakatsu 1997: 228-29). He thus proposes that these traditional accounts, which were inclined towards the land, should be changed to a perspective based on the maritime networks. However, in my opinion, it is more important to consider the importance of such maritime links through incorporating both viewpoints.

Japan's traditional industry and culture should be approached and integrated from the

three aspects mentioned above. Three main elements should be considered. Firstly, Japanese industry and its culture based on rice farming; secondly, the mountainous areas involved in forestry and goods transportation; and finally the important role of oceans, rivers and inland water ways as the main arteries of domestic trade.

2 Japanese modern industrial and corporate system

2. 1. The conversion to an improved trade system based on overseas resources and advanced western technology

Japan's economy had striven to rebuild industries mainly based on making the most of domestic resources from the late 1940's to the beginning of the 1950's. This was due to repentance for the war of aggression, the experience of autarky during the war, and the occupation policy of Japan by General Headquarters under the leadership of the U. S.

However, the U. S. policy towards Japan changed radically through reconstructing the Japanese economy as a breakwater of capitalism and an industrial base as the Cold War tension between the U. S. and the Soviet Union increased. Overseas resources with low-price and high quality; iron ore, coal, oil, etc. could be imported. Under such circumstances, the Japanese industrial system oriented to an improved trade system that depended on overseas resources and advanced technology of Europe and the U. S. Following this, cheap, high quality, crude oil from Middle East Asia appeared in the international market. The exploitation of resources for the iron and steel industry, namely, iron ore and coking coal, was also established.

The Japanese industrial system accelerated the policy based on overseas resources and promoted efficiency on a large scale with the aim of catching up with Europe and the U. S. This policy mainly centered on heavy chemical industrialization.

2. 2. The formation of Japan's postwar industrial and corporate system

2. 2. 1. The formation and centralization of a power oriented network system

The framework of the Japanese industrial system was formed in the period of high economic growth and the subsequent overcoming of the oil crises. The first of the fundamental features is a set of vertically oriented networks based on the centralization of power, legal system, and bureaucracy. These networks were formed as the system shifted attention away from enhancing efficiency in the priority allocation of national economic resources to that of strategic industries and corporations. This was due to the acute circumstances immediately after the war. Furthermore, the Japanese economy lost its prewar colonial possessions. Japan was thus faced with a large gap between Europe and U. S. companies in regard to their

management and technology.

The Antitrust Monopoly Law, which was enforced in 1946, was drastically deregulated by serial revisions in 1949 and 1951. The amalgamation of companies and special cartels became able to form themselves under this implemented law. Bureaucrats monitored and controlled industries and companies by means of various kinds of regulative authorities and administrative directives, the so-called "*Gyosei Shido*". The so-called "*Amakudari*" system, which literally means "Descent from heaven", was also actively developed. Its function acts as a reward and benefit to big companies by bureaucrats, by appointing former officials to important posts in private companies. Various kinds of trade associations, namely "*Gyoukai-Dantai*", also played an important part as a coordinator of networks among government politicians, bureaucrats and big companies (Tona 1996a).

2. 2. 2. The formation of the full-set type industrial and corporate system

The second feature is the formation of full-set type industrial and corporate structure. In Japan's main industries, several major companies with full-line production equipment make a wide range of manufactured products; from general-purpose to high-quality specialized articles. This is often referred to as the "one-set pattern."

This development was due to the following historical circumstances since the Meiji period. Firstly, Japan commenced modernization much later than Europe and the U. S. It developed as the sole modern industrial nation in East Asia, a region where a rather tense political climate still endures (Seki 1993: 39). Secondly, the Japanese economy suffered from a chronic shortage of foreign currency. It was also obliged to save and effectively use foreign currency in transactions. This stimulated the domestic production of machinery, machine parts, and materials that were imported from advanced countries up until that time. The Japanese economy also strove to export products in order to obtain foreign currency for purchasing overseas resources and to finance the introduction of foreign technology (Fuzi Sogo Kenkyusho Sangyo-chosabu Hen 1998: 5-6). On top of those reasons, the "one-set principle" is deeply rooted within the structure of Japanese society(4).

Such backgrounds created the so-called "Keiretsu one-set pattern": i.e., six large company-group networks that both competed and mutually developed basic industries (Miyazaki 1967; Nakane 1967). Furthermore, in each industry, several big companies with full-line equipment and similar strategies competed with one another. Such striking similarity of pattern derived from the competitive urge driving companies to imitate the pattern of the top corporations (Nakane 1984: 103).

However, it should be kept in mind that not all corporations participated in such keen competition. In fact, certain companies of certain industries created a controlled, non-

competitive, market environment.

2. 2. 3. The corporate and industrial networks under the control of large companies

The structure of the system is now in transition. At present, the third feature of the corporate and industrial system is that the major companies now take the main initiative. Big companies, which raise funds from banks in the Main-bank System, hold bank stocks and those of other companies they do business with. Confidence and trustful relationships, both in-house and between companies, are highly regarded. As a result, long-term, continued business connections tend to prevail.

In most of the larger Japanese companies, the personnel system has been structured in line with the practice of long-term employment. The main elements are: the practice of hiring new employees; the reallocation of personnel at fixed times; the practice of raising salaries at fixed times; and company retirement. Decision-making involving personnel matters centers on the personnel department of the head-office, which also has the power to influence and exercise control over its in-house union.

Japanese unions are organized company by company, not by any particular craft or industry. Each company has its own union, which is usually defined as either an enterprise union, or an in-house union. Union-management cooperation prevails in most of the larger companies on the premise that they are on common ground when it comes to negotiations. They are thus tempted to make the most appropriate compromises under the initiative of management. Many people criticize such negotiation procedures as merely a collusion of interests. In this sense it is more appropriate to define such unions as "company unions".

The main activity of in-house education is on-the-job training (*OJT*). Experienced employees teach the younger ones while actually working. They thus work together to improve the company's business performance. There is another unique aspect of Japanese in-house training: namely, frequent job rotation. The process cultivates both multi-skilled workers and the so-called "generalists". The latter are general skill employees who fulfill work-tasks in a wide range of roles within the company. It has prompted information exchange between departments and plants. Small group activities, especially on the shop floor, help to improve productivity, quality and operational efficiency continuously. They have played an important role as networks that have helped foster and advance in-house know-how and skills.

Multi-layer type disparity structures and pyramid style production systems, tended to be formed. The head offices of the big companies become located in the Tokyo-area. On the other hand, in the local areas production functions were developed as gigantic industrial complex, and corporate castle towns were formed under the "invitation-type" industrial

development policy of the government in the economic growth period. This policy concerned local governments inviting large companies to set up their businesses in a specific regional areas. The dual structure of the Japanese economy, as historical characteristics, produced high ratio of subcontracts in each industry. Disparity of wages and working conditions between big and small companies, between male and female workers, and between regular and part-time, temporary employees have been considerable. The high ratio of subcontracts allowed not only parent companies to save costs of wages and working conditions, but also helped reduce and cover various risks. Furthemore, it contributed to improving quality, accelerating technology development and lowering costs.

3 Japanese paradigm in contemporary industrial and corporate networks

3.1. Dynamism and problems of vertically organized networks

3.1.1. The fundamental characteristics of vertically organized networks

Vertical organized ("*tategata*") networks[5] under the leadership of large companies are the mainstays of contemporary Japanese industrial system. The characteristics are seen in each network between government and large enterprises, among companies, and in-house departments.

Trade association of industry was originally formed to establish equal networks among companies. However, the mainstream is virtually the organization under the initiative of large main companies in the industry. It functions as a network under the control of large companies. It creates and exploits the horizontal networks between large companies. On the other hand, it can also establish various cartel barriers. For medium and small-sized enterprises, which take their orders from large companies, this system functions as vertically organized networks. In addition, the informal vertical networks have been formed between government politicians, bureaucrats and large companies through trade associations. Their role is to take responsibility for various government policies or initiatives. As a reward and benefit to the main large companies by bureaucrats, appointments of former officials to important post in private companies, has become the norm (Tona 1996a).

There are also the vertical networks between each large company and its Keiretsu companies, involving subsidiary companies and subcontractors. The subcontract system strengthens the vertical networks between the parent company and the Keiretsu subsidiary. However, not only does it make difficulties in forming horizontal networks among medium and small-sized enterprises, but it also functions to restrain their spontaneous generation (Aichiken. 1998: 70).

The vertical organized networks dominate the labor-management relations. A labor

union is originally a solidarity organization on equal footing within union members, but it must function within horizontal ("*yokogata*") networks. However, the labor union of parent company is organized separately from those of subsidiary companies, which are controlled by the parent company's union. Even in industrial federations, which are formed by the enterprise unions in most industries, the vertical networks such as led by large companies, especially the leader company are often evident. Furthermore, parent company intervenes in the union official elections and personnel (Tona 1996a). In this way, the vertical networks led by main companies exert strong influence and power.

3. 1. 2. The Organization of horizontal networks on the initiative of large companies

The vertical networks led by large companies demonstrate the dynamic functions peculiar to Japanese style corporate society, the so-called "vertical society". The close unity of homogenous groups produced rapid and high-density exchange of information, and human interaction (Nakane 1967). It also contributed to the promotion of the high economic growth. Furthermore, it developed a system which reinforced the vertical networks: that is to say, the horizontal networks were limited to in-house departments or within Keiretsu companies (Aoki 1992: 27).

For example, small group activities were stimulated to form horizontal networks in each group and between groups. They helped increase the worker's desire to work, enhancing the worker's activities to improve operational efficiency and drawing upon the worker's own ideas and originality.

The job rotation system also promotes in-house horizontal exchanges. In the case of blue-collar workers, job rotation is carried out within the factory. This system helps stimulate the production of multi-skilled workers and horizontally organized networks. This is achieved through personnel transfers over the group at a fixed time and through encouraging various working experiences at different stages in the productions. In the case of university graduates (white-collar workers), job rotation creates a broader range of horizontal networks through personnel transfers between head office and factories or among independent divisions.

The small group activities are formally or originally voluntary overtime activities, however they are in fact regulated by vertical organized networks. They are almost invariably due to the initiative by the group leaders, who are responsible for positive participation, or the extent to which the results are used in personnel evaluation. The vertical organized networks also control job rotation because the personnel decision making centers on the personnel department of head office, especially in the case of university graduates, the labor section of the factory, and blue-collar workers.

3. 1. 3. The contradiction inherent in the vertical networks

The vertical networks, while they played a significant role in accelerating high economic growth and in overcoming the oil crises, exhibit the following contradictions.

Firstly, the close but opaque relationships, between government, bureaucrats and large companies have also become "hotbeds of cozy relations." Such relationships are often linked to cases of bribery, corruption and the wastage of the national financial resources.

Secondly, the informal cartels of the vertical networks supported by government and bureaucrats have functioned as barriers to outsiders. They have not only restricted the competition with heterogeneous competitors, but also have restricted and warped competitive forces in the business world. In regard to their products, the major companies have kept pace with product prices. However, they have not only pursued policies of non-price, i.e. "controlled price" competition but also accelerated the competition of quality and service. Initially, the production system was geared to high quality and service. As a result, the production equipment did not change in response to the shift toward less costly production.

Thirdly, the employment system of large companies and, in which being based, closed labor market has led to the enclosure of talented and high skilled workers into the major companies producing a vast number of "*kaisyaningen*" ("company people") and "*hatarakibachi*" (the so-called "worker bees"). This has made difficult for workers to obtain socially approved specialties and skills. It has also robbed them of the chance to become socially independent.

Fourthly, Keiretsu subsidiaries and subcontractors had been organized into the vertical networks of parent companies. This served to restrict or disturb the voluntary and independent formation of horizontal networks among medium and small-sized enterprises.

3. 1. 4. The contemporary vertical networks: the difficulties due to rapid changes in internal and external circumstances

The above mentioned vertical networks have drastically changed due to the certain circumstances: the rapid shift in the appreciation of the yen; large-scale restructuring of production; and the shifting of their production bases overseas since the latter of 1980's. The global mega-competition, which was accelerated by the international tide of the financial Big Bang and privatization, has also impacted on the Japanese economy. As a result of price reduction, the price gaps between Japan and interational markets, in some main industries, have been rapidly reduced, thus reaching international price levels. The reverse price gaps are even seen in some products. They have also brought about deflation connected with economic recession.

On the other hand, large manufacturing companies accelerated to shift their domestic

production bases overseas and to purchase component parts overseas. Under such circumstances, the subcontract system, which meant that large companies held medium and small-sized companies in their Keiretsu subsidiaries, are now confronted with drastic downsizing and reorganization. For the major automobile-makers, mutual transfer of their first contractors has emerged, and the reorganization of subcontract systems has increased in the Japanese automobile industries.

Action groups considered with social issues monitor and attempt to gain access to the opaque networks between government politicians, bureaucrats and large companies, namely "iron triangle", as successive scandals of their relationships emerged. Nowadays, people are encouraged and urged to promote the radical examination and reorganization of previous practices, i.e. disclosure, specification, etc. The severe restructuring also extends to trade associations, which are compelled to rationalize and drastically reduce their functions. The key function as the coordinator of "iron triangle" has become restricted owing to its own weaknesses. In-house networks have also been faced with difficulties; especially due to the rapid and large-scale downsizing of manpower. As a result, workers can not afford to promote small group activities.

Thus, the vertical networks controlled by "iron triangle" are now demanded by the public to reform both systematically and radically.

3. 2. The formation of horizontal networks among regions and small firms

3. 2. 1. The shift from vertical to horizontal networks

Japanese subcontract companies exhibit certain characteristics. Firstly, their ratio to large companies and the number of subcontract companies dependent on large companies is very high. Especially, in the areas where the large-scale factories of specific big companies are located. In a sense, the situation can be linked to a "corporate castle town". In these locations, vertical organized networks tend to exist under the initiative and dominance of the specific large enterprises.

Central functions of management have concentrated in and around the Tokyo area. In the "corporate castle town," production has only inclined towards accumulation, therefore valuable "know-how" has not accumulated. The influence and dominance of the specific big company are strong where vertical Keiretsu relationships between the parent company, subsidiaries and subcontractors have been formed. The information networks are one-way (namely from the parent company to subcontractors), limited (to manufacturing) and affiliated ones. Keen competition to receive orders among subsidiaries or contractors have made it difficult to form horizontal and voluntary networks among them (Suzuki 1998: 32-3).

The results of the subcontract system with division and corporation, which have been

mainly exploited by parent companies, have not in fact benefited subcontractors. However, from the perspective of medium and small-sized companies, such as contractors, there are signs of breaking them away from the subcontract relationships and diversifying their customers. The movement can be considered to be independent from the vertical networks controlled by parent companies (Nakamura, Sy 1992: 178-79).

Especially in the big cities, such as Tokyo and Osaka, one can see the areas where horizontal, voluntary organized with reciprocal contract (so-called "*yoko-uke*") system are formed. A lot of medium and small-sized companies, while they have vertical networks with their parent companies, enhance their independence from their parent companies in Ota Ward and Sumida Ward of Tokyo and in Higashi-Osaka city. The ratio of medium and small-sized enterprises within subcontract system are not low. However, research institutes of large companies accumulate in these areas and the following reciprocal contract networks are formed. It is necessary to collaborate in accepting orders such as trial manufacturing and complete final products by mutually covering with their own special and technical skills. They are called "order by bicycle networks", which means close and clustered exchange within cycling distances, or "back alley's networks" (Aichiken. 1998: 87-8). These spontaneous, horizontal and parallel networks among medium and small-sized enterprises are supplemented by various supporting networks such as industrial policies of local governments.

3. 2. 2. The movements of horizontal networks peculiar to regions

The movements of the medium and small-sized enterprises have involved the fields of basic technology indispensable for manufacturing and functioned as technological bases of manufacturing networks throughout Japan. They have played an important role as public assets (Seki 1993: 72). The industries that have vertical networks under the initiative of big companies are basic and export-led or export-oriented industries with international comparison superiority. They have become internationalized through importing raw materials and exporting products, and industrialized or refined mass production technologies.

On the other hand, there are few medium and small-sized enterprises which have tried to take firm root in the region. They have attempted to find the means to survival as native companies and industries peculiar to their regions. Other companies have achieved greater levels of internationalization, through adopting more global strategies. The information networks of local industrial cities, with spontaneous development style, have contrastive features with those that accumulated industries under the invite-type development policy. Various functions with a core of head offices ones accumulate in the districts and complex division relationships among regional enterprises are formed. Under such horizontal organized business networks, information networks peculiar to the regions are accumulated

(Suzuki 1998: 200-2).

So far industrial policies of local governments have attached too much importance on hardware, and have inclined to focus on construction and real estate, such as building construction and administration. There is a common tendency that the production of cooperative and collaborative networks are prone to be postponed or shelved indefinitely. Producing functional administration systems for leading medium and small-sized enterprises appropriately are required. There is also a need to create appropriate industrial systems in the various regional areas (Nakamura, Sy. 1992: 217).

Nowadays, there are instances in which regional networks are in support of the independence of the companies and industries. These are formed and connected with the supporting networks of local administrations. They are also connected with the networks for creating the unique character of the particular town and to improve the amenities of the districts.

Comprehensive networks for supporting independence are often required. The horizontal and spontaneous networks among medium and small-sized enterprises are tied up with the networks, having taken root in the regional areas. The networks encourage degrees of independence including the implementation of industrial policies of local administrations. Furthermore, the vertical networks under the initiative of large companies need to overcome their exclusive characteristics: namely, closed-door orientations to civil society. These changes can evolve into more open networks for supporting and covering the horizontal networks.

The movements to produce such kinds of flexible networks must stimulate the vector conversion of industrial structure. The Japanese industrial structure is made up mainly of manufacturing industries that are dependent on their highly mechanized production systems. They have changed from heavy and large-scale type industries to smaller scale types due to the oil crises and the revolution in micro-electronics etc. However, welfare and medical-care industry, various kinds of service industry and recycling and environmental industry are expected to heighten their roles as basic industries. This is largely due to social needs such as coping with a rapidly increasing elderly population.

The postwar medical industry developed largely due to the guarantee of a universal national wealth system based on the public health and medical insurance system. With the enforcement of national nursing care insurance system, the privatization of welfare institutions will be developed into a more occupational-based system. Furthermore, various kinds of nursing care facilities for senior citizens will be further developed. Thus, the welfare system also has the potential to develop into a vast privatized, welfare industry.

The above mentioned movements should be connected and integrated with the activities of public works and industries. This can be seen in the movements to create distinct civic

identities through the initiative of residents, various kinds of voluntary activities, and the horizontal and spontaneous business networks among medium and small-sized enterprises. To operate effectively, these organizations involve the support of linked networks of administration.

4 The new paradigm in industrial, corporate system and manufacturing

4. 1. Fostering of the resonance system within industry, corporations and culture

The high levels of internationalization, globalization or universality orientation (i.e. international standardization) bring about a reverse process that stimulates the indigenous characteristics to each region and the individuality of each corporation and industry. Today, the fortunes of industries and corporations have become more unpredictable. Therefore, it is more important to consider intellectual assets, which have been formed in the region, such as technology, culture and so on, (i.e. "know-how"). They should be adopted and applied to the new industries, even if the traditional industries are in decline.

The postwar development of the Japanese industry system was mainly based on the following strategies. Heavy chemical industries, heavily dependent on overseas resources and advanced technology of Europe and U. S., developed as the full-set type, with the centralization of a power oriented networks. These industries became further separated from the outlying regions. During this process, basic resources, i.e. land, water, coastlines and so on, were overexploited and often wasted as a valuable resource. However, once main large companies changed their strategy or confronted their difficulties, their factories suffered cutbacks or closures. As the result, many local economies have fallen on hard times. The effects of the protracted recession have been seen in many regions throughout Japan. There has been a tendency that efficiency and profit have been taken priority and industries have also been separated from the regions and culture. Nowadays, however, the demand for creative and original technology and refined industrial "know-how" is steadily increasing. Thus, attempting to change from the usual practices becomes a urgent problem.

Nowadays, a new theory of industrial system is required. There is a need to recognize industries as integrated or more connected with their regions, "know-how" (Ikegami 1996a: 44). It is necessary to rethink industries from the viewpoint for succeeding and developing "know-how", and to connect industries with indigenous characteristics of their respective regions (Ikegami 1996b: 44). This aim is to produce a more dynamic and interactive system of industry and culture. What is the nature of the undercurrent that can stimulate such an orientation ? The following sections will approach the subject from the viewpoint of harmonizing, integrating and stimulating the process of networking between industry, tech-

nology and culture.

4. 2. The harmonizing, integrating and networking of industry, technology and culture

4. 2. 1. Integrating and networking with micro-electronics technology

The development of micro-electronics (the so-called *ME*) technology is one of the main factors which accelerate the integration and networking of industry, technology and culture. The core of *ME* technology is control technology. The revolution of control technology relates to the core technology common to each industry. Control technology helps reduce barriers between industries, expands the conditions and potentiality of mutual transference among them, and helps to stimulate the degree of integration (Miyazawa 1988: 10).

Furthermore, the development of communication technology and its close relationship with the control technology has produced bases of technological networking which have transcended industrial and spatial differences. This networking refers to the nature of the connections among the various elements (Imai 1984: 4-5). Through the process of networking, producing products, software and supplying services become more integrated and unified (Imai 1984: 113).

Networking has produced levels of industrial harmonization and integration (Imai 1984: 120-1). Firstly, technology harmonization is rapidly increasing. Such kinds of technology that were usually thought of as heterogeneous, i.e. communication and information processing, are changing into more homogeneous technologies. They are becoming more integrated through paying attention to the management, processing and analysis of information. Secondly, information-oriented process is rapidly increasing input elements common to each industry, i.e. software. Thus, networking, in itself, tends to accelerate industrial integration.

4. 2. 2. Reintegration of technology and skill

We have now reached the historical stage whereby technology and skills have been successfully harmonized and reintegrated. Technology and skills, which were originally unified, were separated in the process of modernization and often coexisted within vertical relationships. We are now in the phase that both have become reintegrated due to the *ME* revolution (Munakata 1996: 102; Mori 1995: 77-9).

Technical skill and its "know-how" have been transferred and transplanted to the means of production by mechanization and to *ME* technology by software products. On the other hand, the transfer of high-level skills to *ME* technology has stimulated the recurrence to, and demand for, original skills. In order to fully exploit the opportunities presented by high technology, it is necessary to fully understand the properties of the various materials and to develop the required skills. It is crucial that the introduction of new technological tools is

matched with a corresponding increase in high level skills (Mori 1995: 82).

Production technology tends to formularize production and normalize it. The progress of technology means the expansion of assessing the potential for change (Munakata 1996: 159, 177-8). On the other hand, abnormal factors that obstruct normalization continually occur. There are various factors that hinder assessing the potential for change. The aim of technological progress is to bring about such changes. Technological process creates diversity in many areas, in the same way diversification is manifest in the natural world. In this way, the new technology stimulates and encourages the initial process of diversification. The main factors are the various markets and the diversity of the natural world. Technological progress also results in diversity. Although such diversity may predominate in a particular area, traditional skills can still adapt and effectively function in the new environment. It is because technical skills create the ability to cope with any change, but it is also impossible to predict the nature of such changes (Munakata 1996: 177).

4. 2. 3. Harmonizing of industry and culture

Manufacturing process involves strategic planning, setting specific standards, and evaluating the results. There is also a sense of value involved in the evaluation and assessing of certain criteria. It also involves formulating a system of values, such as judging what is of practical use to us (Mori 1995: 3). It is necessary to consider the deep relationship exists between manufacturing and culture. This is because culture is the creation of a symbolic society and a set of generally accepted cultural values (Miyazima 1993).

On the other hand, the expanding demand for higher function and culture in their daily life can stimulate the reintegration of "practical culture" and "genuine culture" (Ikegami 1996c: 62). We are now in the era in which industry and culture are related and connected more profoundly than ever before. Goods and services, which involve diverse complement relationships, are integrated into one system in which various functions mutually depend, connect and interact. Thus the corporate and industrial system has become more deeply inter-related with culture, i.e. through customs, traditions, social systems and so on.

4. 2. 4. Harmonization and Integration of agriculture and manufacturing industries

The great potential that the harmonization and integration between agriculture and manufacturing industries can create and develop also influences information technology and genetic engineering. High technology makes traditional agriculture able to regenerate through further developing precision agriculture. It is also able to enhance productivity through drastically decreasing the use of harmful chemicals.

Manufacturing industries have a problem in reforming from non-recycle systems. Such

systems excessively depend on underground resources as dwindling, limited natural resources. The manufacturing industries are expected to approach agriculture through common strategies, namely, by using the flow type recycle system peculiar to agriculture. Both should be reorganized into sustainable systems within the capabilities of natural circulation and the global recycling of resources. This becomes feasible only when harmonization and integration of agriculture and manufacturing starts to develop.

Modern industries have broken down the traditional barriers of mankind by utilizing natural resources and making great progress in developing global industries. Since that time, the standardization and availability of materials, machine parts and "know-how" have enhanced the universality of the modern industries. Improving the efficiency of energy and raw materials, and the transportation revolution have made it possible to transport various kinds of mineral resources and materials from every part of the world.

In the postwar period, iron and steel industry witnessed the revolution of the industrial location system. This involves a shift from regional-resources oriented location system to a coastal location system. In Japan, the revolution resulted in large-scale development. The increased levels of efficiency in energy resources and raw materials were due to the revolution in transportation and processing technologies. This was partly achieved through the development and construction of large-scale marine bulk carriers, such as massive oil and mineral tankers.

By contrast, agriculture is closely connected with regional resources such as climate, soils, and rivers irrigating systems. The separation and expansion of agriculture and manufacturing industry have expanded the character of the modern industrial system towards a more non-recycle system. Nowadays, the organic integration of agriculture and manufacturing industry, and the expansion and development of recycling have become important factors in constructing a sustainable industrial system.

The ideas and "know-how" of the Japanese traditional industry and its recycle system built up by the rice farming industry, based on paddy fields, cultivation should be given a new lease of life as the next-generation type industry. This can be achieved by integrating high technology and refining modern "know-how".

4. 2. 5. Harmonizing of work, leisure, learn and education

The three activities, work, leisure, learning and education, are the most fundamental elements in our life. Today, the work place is separated from our daily domestic life. This distinction did not exist before the advent of high economic growth. There exists a distinct separation of work place and place of residence. This separation often entails long-distance commuting or having to endure the inconveniences of a "commuter hell". Furthermore, in

Japan for example, defining one's specific work task or specialty becomes somewhat blurred. In large corporations or institutions, the anonymous term "salary-man" is used to cover a wide range of jobs.

The separation of work place from the place of daily life have weakened the relationship that children learnt through such direct experiences as children by observing their parents or other adults at work, or helping them in their daily life. Nowadays, however, in certain regions, the amount of space, social contact and time available for their activities has been dramatically reduced. This is because the work patterns and life styles have undergone considerable change over the past four decades.

Work itself also has caused to increase a level of stress. Under internationalization and information-oriented society, more work is demanded for more complex tasks, which require longer hours, more efficiency and higher levels of precision. Serious sexual discrimination in the work place and wage gaps between regular and part-time workers etc. have caused to heightened the dependence on male workers and their responsibility in each household. This has resulted in the deaths of a number of company employees through "overwork": as known as the "*Karoushi*" syndrome. Many employees are alienated from their families and regions due to the long hours demanded by their companies. Shifting production bases overseas and restructuring under a prolonged recession have caused serious unemployment. Various symptoms of economic recession such unemployment, bankruptcy has also caused a dramatic increase in suicides among middle-aged adult males.

In contemporary Japan, the demand for the adequate treatment of mental health is unprecedented. Moreover, there is also a call for establishing new values and aspirations in life. The revolution in education is also increasing with an attempt to connect education with work or volunteer activities with more attention to mental education, career, or life prospects.

There is a global demand for a deeper relationship between work and education. Graduates or undergraduates in the university study more social or practical business subjects. The focus on the desire for learning is based on their specialty and social independence. Therefore, it transcends the usual limits of in-house training, such as in-house education and small group activities.

What people originally seek in their work is to find and develop their own-selves through work. This is a form of self-realization. The heart of the leisure often resides in the work. The excitement created through a game, such as betting, for example, can also be evident in the process and activity of manufacturing. On the other hand, self-realization and self-expression, which is the essense of work, is inherent in the act of leisure. Thus work and leisure can be seen as human networks which are mutually complementary (Kuroi 1972).

Never before has the need to be involved in leisure been so desired in the work place.

At present, we are in the period that work, leisure, learn and education are becoming harmonized. The industrial system is creatively responding to such deep desires and demands.

Conclusion: Towards a more dynamic, flexible system of industry and regions

The postwar Japanese corporate and industrial system was formed as full-set and pyramid type division system under the vertical organized and centralization of a power oriented networks that dominated throughout various administrations, industries and companies. However, the framework of internal and external circumstances, which was the premise of the system, has greatly changed due to the following events: namely, the achievement of catching up with Europe and the U. S.; the collapse of the Cold War system; the rapid development of East Asian countries and the aging of society. The wave of globalization and information oriented society, which has also been sweeping over the world economies, has impacted on the Japanese economy. Furthermore, various kinds of system reform and global environment issues continue to change the fabric of industry and transform the various regions.

Under such circumstances, the vertical organized networks with the initiative of large enterprises have managed to solve various kinds of problems, through slimming down and the promotion of a reorganization of a pyramid-type division system. On the other hand, horizontal and decentralized networks have gradually formed among medium and small-sized enterprises and in regional areas.

The Japanese manufacturing industry has accumulated diverse and high skills and "know-how" which are limited to in-house initiatives but it has been achieved without any social evaluation system. Those skills and "know-how" should be opened to society and fused within a social evaluation system. Furthermore, the movement for changing technology as a development system from an improvement and application oriented type to a more prototype creating-type system should be accelerated.

The relationships between industry and culture, technology and skills, agriculture and modern industry, city and farming village were separated and developed during the process of modernization. The historical process, in which they are harmonized and reintegrated or unified systematically through micro-electronics and genetic technology and recycle system etc, still continues. At this historical turning point, creative efforts to produce the necessary networks for supporting independence and individualistic development by companies and individuals are required. It is an important issue as the burden of producing new style

industries, enterprises and regional industries is continually increasing.

Notes

(1) This paper was originally prepared for, and presented at, the SEAS Seminar at University of Sheffield, School of East Asian Studies on 8th March 2000.

I am grateful for all the comments received during the seminar; among these I am appreciative of specific comments by Dr. Hasegawa (the coordinator of the seminar) and Professor Glenn D. Hook.

(2) Japan's worst-ever nuclear accident occurred on 30th September 1999 at a fuel processing plant in the Ibaraki Prefecture town of Tokai-mura. It occurred when workers violated safety regulations and poured an excessive amount of uranium into an improper tank, setting off a chain reaction.

On 9th October 1999, in a tunnel along the Sanyo Shinkansen bullet-train line, one of the country's trunk lines, 230kg of concrete fell from a wall, closing down the line for 10 hours. A similar accident occurred in June in a different tunnel on the same line. The authorities said it had finished inspections and repairs for all tunnels after the first incident, declaring that such a thing would not happen again for at least ten years.

The launch of the H-2 rocket has been postponed three times so far. Before the second test launch, the operators made a mistake in connecting pipes to the rocket, which resulted in fissures in fairing and another delays when they were found (Nikkei Weekly, November 8th, 1999).

(3) It is such as an economic system in which a country produces all the things it needs as opposed to buying them from other countries.

(4) From Nakane (1984), the one-set principle was also seen in the prewar Zaibatsu monopoly and it is based on the Japanese native social structure, namely the vertical organizational principle (op. cit. 103-6).

(5) Nakane (1984) defines the two categories, "vertical" and "horizontal", as the basic concept that can be applied to various kinds of personal relations. Vertical systems link persons, who are different in quality and function, by forming clusters within which the upper-lower hierarchical order becomes more pronounced. In contrast, a horizontal tie is established between persons who are on the same level of quality (op. cit. 24-5).

Reference

Aichiken Chusyokigyo-kenkyu Zaidan Hen (1998) *Kudoka wo koeru Gizyutsu to Nettowaku* (Technology and networks to overcome the hollowing out of industry), Aichi, Aichiken Chusyokigyo-kekyu Zaidan.

Aoki, M. (1992) *Nihon Keizai no Seido Bunseki: Jyoho, Insenchibu, Kosyo Geimu* ((1988) Information, Incentive and Bargaining in the Japanese Economy, Cambridge University Press), Nagai Koichi Yaku, Kyoto, Mineruva Shobo.

Fuzi Sogo Kenkyusyo Tyosabu Hen (1998) *Monodukuri Kakumei* (The revolution of manufacturing), Tokyo, Toyokeizaisinposya.

Greg, I. (1998) Japan's best loved songs of the season, Tokyo, The Japan Times.

Ikegami, J. (1996a) *Gendai Keizaigaku to Kokyo Seisaku* (Contemporary economics and public policy), Tokyo, Aoki Syoten.

Ikegami, J. (1996b) *Joho Shakai no Seiji-keizaigaku* (Political economics of an information society), Tokyo, Maruzen.

Ikegami, J. (1996c) *Maruchi-media Shakai no Seiji to Keizai* (Politics and society in a multimedia society), Kyoto, Nakanishiya.

Imai, K. (1981) *Jyoho Netto Waku Shakai* (Information networks society), Tokyo, Iwanamisyoten.

Inoue, H. (1992) *Kome no Hanashi* (Stories of rice) Tokyo, Shinchosya.

Kawakatsu, H. (1997) *Bunmei no Kaiyo Shikan* (A maritime view of history), Tokyo, Chookoronsya.

Kuroi, S. (1972) *Hataraku to iu Koto* (Work), Tokyo, Kodansha.

Miyazaki Y. (1967) *Sengo Nihon no Keizai Kiko* (The economic postwar system of Japan), Tokyo, Sinhyoron.

Miyazawa, K. (1975) *Sangyo no Keizaigaku* (Economics of industry), Tokyo, Toyokeizaishinposya.

Miyazawa, K (1988) *Gyosaika to Johoka* (The orientation toward inter-fields and information: the impact on industrial society) Tokyo, Yuhikaku.

Mori, K. (1995) *Haiteku Jidai no Gino Rodo* (The skilled work in the high technology era) Tokyo, Chuoshokugyonoryokukaihatu Kyokai.

Munakata, M. (1996) *Shokunin to Gendai Sangyo* (Workmen and contemporary industry), Tokyo, Gijyutsu to Ningen.

Nakamura, Sy. (1992) *21 Seiki-gata Chusho Kigyo* (Medium and small-sized enterprises for the 21st century), Tokyo, Iwanamisyoten.

Nakamura, Se. (1973) *Gendai Kogyo Keizairon* (Economics of contemporary industries), Tokyo, Chobunsya.

Nakane, C. (1967) *Tate Shakai no Ningen Kankei: Tan-itsu Shakai no Riron* (Human-relations of vertical organizational society: The theory of a homogeneous society), Tokyo, Kodansya.

Nakane, C. (1984) Japanese Society, Tokyo, Charles E. Tuttle Co..

NHK Kokusaikyoku Keizai Purojekuto/Daiwa Soken Keizai-chosabu (1995) *Eigo de Hanasu Nihon Keizai* (A bilingual guide to the Japanese economy), Tokyo, Kodansha Intanashonaru Kabusikikaisha.

Nippon Steel Human Resources Co., Ltd. (1987) Talking about Japan, Tokyo, Aruku.

Seki, M. (1993) *Furusseto-gata Sangyokozo wo Koete* (Beyond the full-set type industrial structure), Tokyo, Chuokoronsya.

Suzuki, S. (1998) *Sangyo Bunka Toshi no Sozo* (Creation of industrial cultural city), Tokyo, Daimyodo.

The Economist (1999) 'A Survey of business in Japan', 27/11/1999, London, The Economist newspaper LTD.

Tomiyama, K. (1993) *Nihon no Kome: Kankyo to Bunmei wa kaku Tsukurareta* (Japanese rice: Environment and civilization are thus created), Tokyo, Chuokoronsya.

Tona, N. (1993) *Nihongata Furekishibirichi no Kozo: Kigyoshakai to Komitsudo Rodo Shisutemu* (The structure of the Japanese-style Flexibility: corporate society and highly intensive labor system) Kyoto, Horitsubunkasha.

Tona, N. (1996a) *Nihongata Tekko Shisutemu: Kiki no Mekanizumu to Henkaku no Shiza* (The Japanese-style Steel Industry: the mechanism of crises management and perspective towards reform), Tokyo, Dobunkanshuppan.

Tona, N. (1996b) *Tekko Seisan Shisutemu: Sigen, Gijyutsu, Gino no Nihongata Syoso* (The steel production

system: the Japanese-style aspects of its technology, skill and raw materials), Tokyo, Dobunkan-syuppan.